Professor Zhanchuan Cai

School of Computer Science and Engineering ,Faculty of Innovation Engineering

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Academic Qualification:

Ph.D. in Computer Software and Theory , Sun Yat-sen University

Teaching Area

COMPUTER LANGUAGE AND PROGRAMMING
FUNDAMENTALS OF ADVANCED ENGINEERING MATHEMATICS
NUMERICAL ANALYSIS

Research Area

Computer Graphics and Image Processing
Intelligent Information Processing
Multimedia Information Security
Remote Sensing Data Processing and Analysis
Applied Mathematics and Scientific Computing

Working Experience

2007-2008,Visiting Scholar , University of Nevada, Las Vegas, USA

2008- present, Assistant Professor/ Associate Professor/ Professor, Faculty of Information Technology, Macau University of Science and Technology, Macau, China

Academic Publication selected

T. Lan and **Z.C. Cai**, Efficient Reconstruction of Industrial Images Using Optimized HMK Splines, IEEE Transactions on Industrial Informatics, DOI: 10.1109/TII.2020.3025182, 2020.

T. Lan and **Z.C. Cai**, A Novel Image Representation Method Under a Non-Standard Positional Numeral System, IEEE Transactions on Multimedia, DOI: 10.1109/TMM.2020.2995258, 2020.

J.J. Chen and **Z. C. Cai**, A New Class of Explicit Interpolatory Splines and Related Measurement Estimation, IEEE Transactions on Signal Processing, 68:2799-2813, 2020.

Q.Y. Huang, **Z.C. Cai**, and T. Lan, A New Approach for Character Recognition of Multi-Style Vehicle License Plates, IEEE Transactions on Multimedia, DOI: 10.1109/TMM.2020.3031074, 2020.

Y.Q. Xiao, **Z.C. Cai**, and X.X. Yuan, YuvConv: Multi-Scale Non-Uniform Convolution Structure Based on YUV Color Model, IEEE Transactions on Multimedia, DOI: 10.1109/TMM.2020.3013352, 2020.

J.Y. Yuan, W. Cao, **Z.C. Cai**, and B.H. Su, An Underwater Image Vision Enhancement Algorithm Based on Contour Bougie Morphology, IEEE Transactions on Geoscience and Remote Sensing, DOI: 10.1109/TGRS.2020.3033407, 2020.

T. Lan and **Z.C. Cai**,Modeling of Lunar Digital Terrain Entropy and Terrain Entropy Distribution Model ,IEEE Transactions on Geoscience and Remote Sensing, DOI: 10.1109/TGRS.2020.2999582, 2020.

Y.M. Zhang, **Z.C. Cai**, and G.Q.Xiong, A New Image Compression Algorithm Based on Non-uniform Partition and U-System, IEEE Transactions on Multimedia, DOI: 10.1109/TMM.2020.2992940, 2020.

W.G. He, **Z.C. Cai**, and Y.M. Wang, High-fidelity Reversible Image Watermarking Based on Effective Prediction Error-Pairs Modification, IEEE Transactions on Multimedia, DOI: 10.1109/TMM.2020.2982042, 2020.

Y.M. Wang, **Z.C. Cai**, and W.G. He, High Capacity Reversible Data Hiding in Encrypted Image Based on Intra-block Lossless Compression, IEEE Transactions on Multimedia, DOI: 10.1109/TMM.2020.2999187, 2020.

W.G.He and **Z.C.Cai**, An Insight Into Pixel Value Ordering Prediction-Based Prediction-Error Expansion, IEEE Transactions on Information Forensics and Security,15:3859-3871, 2020.

X.X. Yuan and **Z.C. Cai**, An Adaptive Triangular Partition Algorithm for Digital Images, IEEE Transactions on Multimedia, 2019, 21(6): 1372-1383.

T. Lan and **Z.C. Cai**, Lunar Brightness Temperature Map and TB Distribution Model, IEEE Transactions on Geoscience and Remote Sensing, 2018, 56(12): 7310-7323.

W. Cao, Z.C. Cai, and B. Ye, Measuring Multiresolution Surface Roughness Using V-System, IEEE Transactions on Geoscience and Remote Sensing, 2018, 56(3): 1497-1506.

Z.C. Cai, T. Lan, and C.M. Zheng, Hierarchical MK Splines: Algorithm and Applications to Data Fitting, IEEE Transactions on Multimedia, 2017, 19(5): 921-934.

Z.C. Cai and T. Lan, Lunar Brightness Temperature Model Based on the Microwave Radiometer Data of 8 V Z' ! : : : I V VX Z XZ XZV YGZb ZHZ ! &! □& / .))" .

W.G. He, **Z.C. Cai**, and Y.M.Wang, Flexible spatial location-based PVO predictor for high-fidelity reversible data hiding. Information Sciences, 2020, 520: 431-444.

J.J. Chen and **Z.C. Cai**, Cardinal MK-spline Signal Processing: Spatial Interpolation and Frequency Domain Filtering, Information Sciences, 2019, 495: 116-135.

W.G. He, G.Q. Xiong, S.W. Weng, **Z.C. Cai**, and Y.M. Wang, Reversible Data Hiding using Multi-Pass Pixel-Value-Ordering and Pairwise Prediction-Error Expansion, Information Sciences, 2018, 467: 784-799.

Books

Z.C. Cai, Fundamentals of Engineering Mathematics, Science Press, 2018, ISBN-13: 978-7030568632. (in Chinese)

J. Huang, **Z.C. Cai,** K.Y. U, Y.Y. Liang, Local Interpolation Explicit Algorithm and Its Application, Science Press, 2016, ISBN-13: 978-7030462947. (in Chinese)

Patents selected

Z.C. Cai and T. Lan, Methods and Apparatus for Encrypting Multimedia Information, US patent, Grant No. 10635786 B2, April 2020.

Z.C. Cai and W. Cao, Method for Improving Calculations of Surface Roughness, US patent, Grant No. 10580150 B2, March 2020.

Z.C. Cai and T. Lan, Methods and Apparatus for Image Construction, US patent, Grant No. 10332279 B2, June 2019.

Z.C. Cai, Methods and Apparatus for Color Image Watermarking, US patent, Grant No. 10296999 B2, May 2019.

Z.C. Cai and W. Cao, Omnidirectional Roughness Algorithm for Topographic Signature Analysis of Lunar Craters, US patent, Grant No. 10354398 B2, July 2019.

Z.C. Cai, Lunar Brightness Temperature Modeling Based on the Microwave Radiometer Data, US patent, Grant No. 10346565 B2, July 2019.

Z.C. Cai and T. Lan, Method for Coding Data, US patent, Grant No. 9755661 B1, September 2017.

Z.C. Cai, B. Ye, T. Lan, and Y.Q. Xiao, Systems and Methods for Reducing Computer Resources Consumption to Reconstruct Shape of Multi-Object Image, US patent, Grant No. 10062187 B1, August 2018 .

Z.C. Cai and Z. Li, Image Stitching, US patent, Grant No. 9990753 B1, June 2018 .

Z.C. Cai, Color Image Watermarking, US patent, Grant No. 10037587 B2, July 2018.

Z.C. Cai, Computer System that Executes Hierarchical MK Splines Scheme for Scattered Data Interpolation, US patent, Grant No. 9990334 B2, June 2018.

Professional Certification and Awards

Second Prize of the Teaching Achievement Award (Co-awarded), Macau University of Science and Technolc

Third Prize of Technological Invention Award of the Macau Science and Technology Awards (Co-awarded), 2

Excellent Supervisor for Contemporary Undergraduate Mathematical Contest in Modeling, CSIAM, 2017

BOC Excellent Research Award, Macau University of Science and Technology, 2016

Third Prize of Natural Science Award of the Macau Science and Technology Awards (Co-awarded), 2012
Excellent Organization Worker for Contemporary Undergraduate Mathematical Contest in Modeling, CSIAM, 2011

Student Awards

Postgraduate Award of the Macau Science and Technology Award, 2016

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HZX YE Z! J 6 L : 8 &(C V VaE " WY VZB V Zb V XVa8 Z B YZa ! &+

Third Prize , O V X Youth 8 12th National Post-Graduate Mathematical Contest in Modeling, 2015

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Second Prize, CUMCM-2019

Second Prize, CUMCM-2018

Second Prize, CUMCM-2017

Second Prize, CUMCM-2016

Second Prize,CUMCM-2014

First Prize, CUMCM-2003

Silver Prize, China Pan-Pearl River Delta Region University IT Project Competition 2010

Gold Prize, China Pan-Pearl River Delta Region University IT Project Competition 2009

Professional Society Membership

Senior Member , Institute of Electrical and Electronics Engineers (IEEE).

Distinguished Member, China Computer Federation (CCF).

Member, Association for Computing Machinery (ACM).

Member , Asia Graphics Association (AG).

Committee3<MCID 27/Lang (x-none)>BDC BT1 0 0 1 56.4 274 274 274 27 27/La2(3<MCID 27/LaMT)4(M))-